

# ARRILASER 2

The Next Generation Film Recorder



## ARRILASER 2 – The Next Generation Film Recorder

The ARRILASER is the only film recorder to use laser technology. With this technology it has set industry standards in image quality, productivity and reliability, and has significantly reduced the cost of recording digital images onto film. It has even been recognized and honored by the Academy of Motion Picture Arts and Sciences (A.M.P.A.S) with a Technical Achievement Award in 2002.

To integrate the latest developments in electronics and software, and to incorporate the feature requests that have been raised over the years by ARRILASER customers, ARRI has implemented substantial changes in the imaging hardware, optics, electronics and host operating system. The ARRILASER 2 now supports a 16 bit image path, utilizes a Linux-based host featuring a completely overhauled GUI which offers unprecedented flexibility of operation and speeds up daily operations significantly.

Over time five different models have derived from the Standard ARRILASER to meet the requirements of various postproduction business models.

The ARRILASER 2 HD/DI represents an entry level system for emerging markets and start-up companies, while the ARRILASER 2 Speed Performance and Speed twoK are mid-range options. At the top of the range are the ARRILASER 2 HighSpeed twoK and HighSpeed Performance models - the ultimate choice for clients who cannot compromise on speed of operation or image resolution.



2002

Scientific and Engineering Award (Academy of Motion Picture Arts and Sciences) for the design and development of the ARRILASER Film Recorder.

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THE INDUSTRY STANDARD  
IN FILM RECORDING



## ARRILASER 2 Models

	HD/DI	Speed twoK	Speed Performance	HighSpeed twoK	HighSpeed Performance
Speed specification	Sec/frame	Sec/frame	Sec/frame	Sec/frame	Sec/frame
HD	3.4	1,9	1,9	0,9	0,9
2K 1:1.85	3.2	1,7	1,7	0,8	0,8
2K Fullap	4.1	2,2	2,2	1,1	1,1
4K 1:1.85	—	—	2,9	—	1,3
4K fullap	—	—	3,8	—	1,9
Intermediate film stock	●	●	●	●	●
Camera negative stock	Optional	Optional	Optional	Optional	Optional
Resolution 2K	●	●	●	●	●
Resolution 4K	—	—	●	—	●
On-the-fly image processing	●	●	●	●	●
ARRICUBE color management	Optional	Optional	Optional	Optional	Optional
Optional module	HD, Native Academy, 3-Perforation				

The ARRILASER is designed as a modular system, so each model is fully upgradeable.  
Please refer to the upgrade matrix at the end of this brochure.



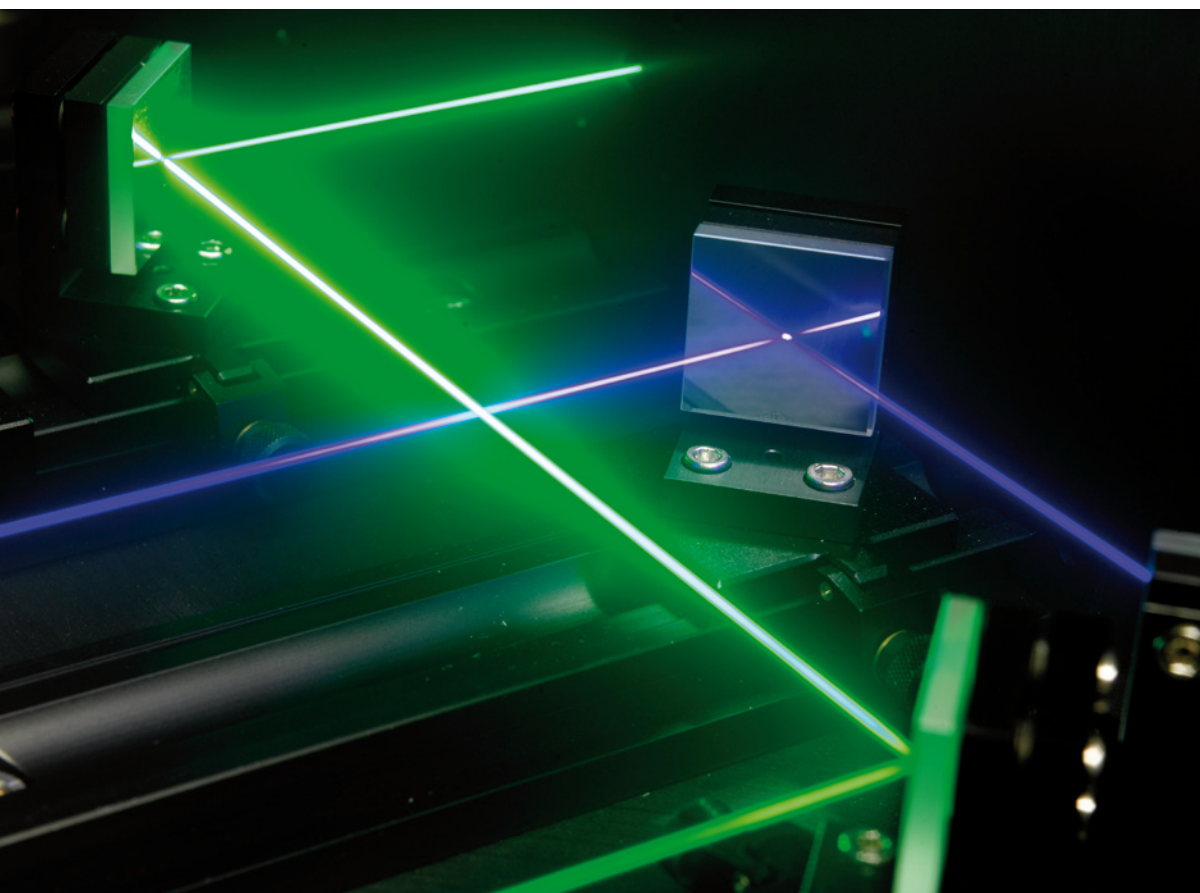
## Laser Light Source

Three solid state lasers are used in the ARRILASER, producing monochromatic light beams in the colors red, green and blue. With a perfect Gaussian shape, very long life expectancy and minimal size as well as power consumption, they are the key to the ARRILASER's unrivalled image quality.

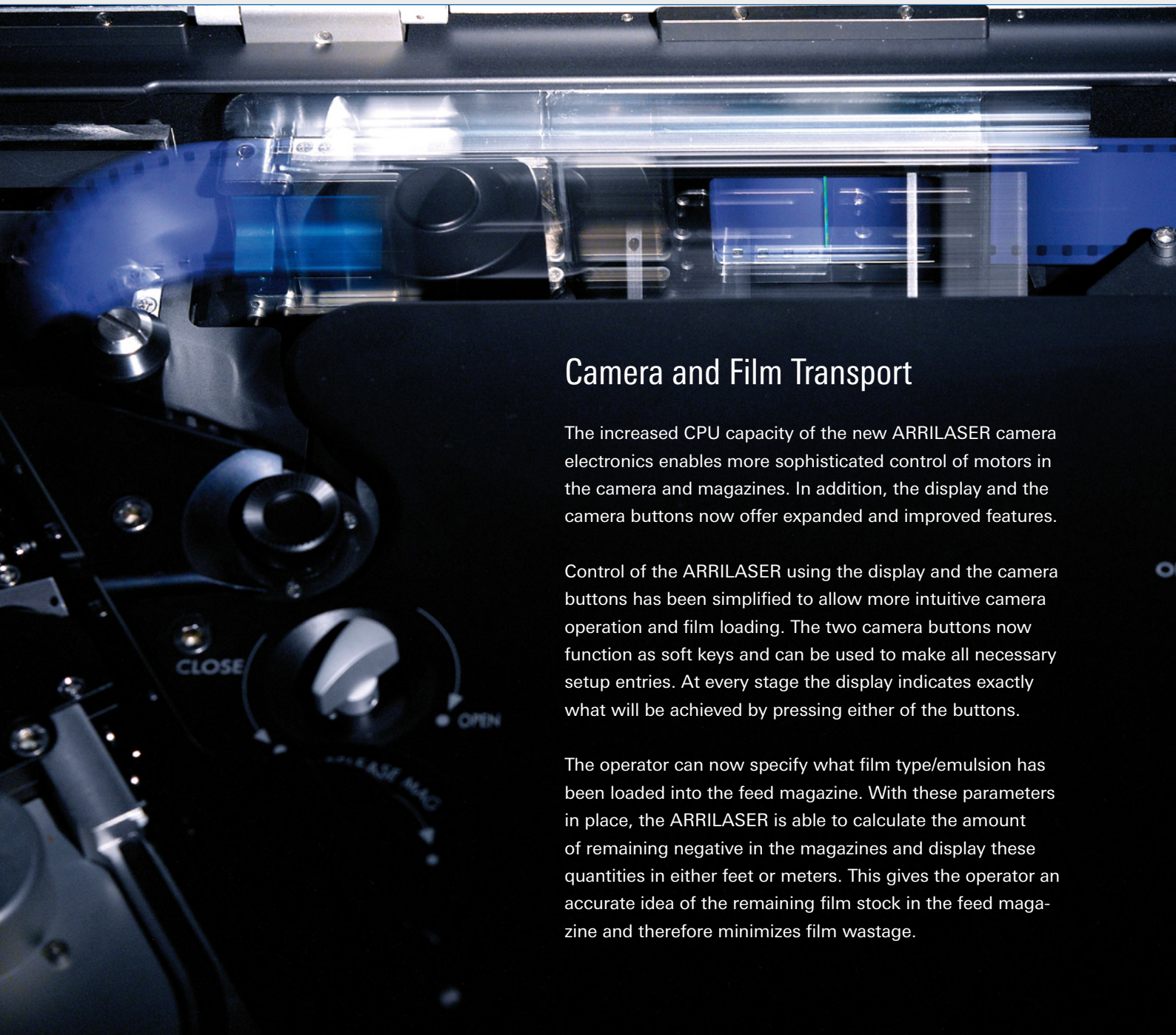
The data for each color channel and pixel is fed to an Acousto-optical Modulator (AOM) as a light intensity value, according to which the beam intensity is controlled. The AOM translates the digital data of each pixel into beam intensity in less than 17 nanoseconds.

## Deflection System

Moving parts on the ARRILASER are designed to sustain a minimum of wear. A new aerostatic bearing motor, which encounters no mechanical friction during operation, is used to achieve the speed required for the deflection of the beam. Line by line is written on film in an ultra precision linear stage. A linear induction motor moves the stage through direct magnetic induction without any additional moving parts such as gears.







## Camera and Film Transport

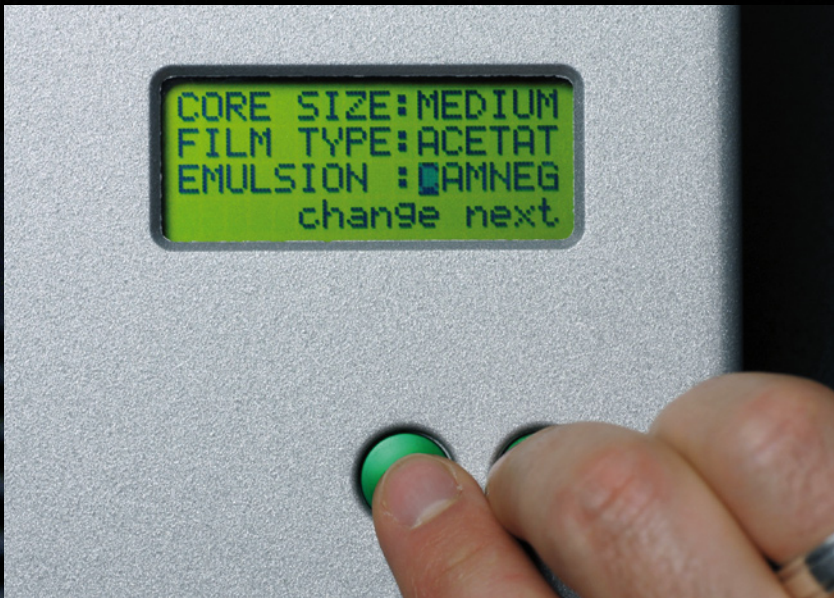
The increased CPU capacity of the new ARRILASER camera electronics enables more sophisticated control of motors in the camera and magazines. In addition, the display and the camera buttons now offer expanded and improved features.

Control of the ARRILASER using the display and the camera buttons has been simplified to allow more intuitive camera operation and film loading. The two camera buttons now function as soft keys and can be used to make all necessary setup entries. At every stage the display indicates exactly what will be achieved by pressing either of the buttons.

The operator can now specify what film type/emulsion has been loaded into the feed magazine. With these parameters in place, the ARRILASER is able to calculate the amount of remaining negative in the magazines and display these quantities in either feet or meters. This gives the operator an accurate idea of the remaining film stock in the feed magazine and therefore minimizes film wastage.



RECORDING  
Progress: 012%  
Load Take  
1832 ft 0175



CORE SIZE:MEDIUM  
FILM TYPE:ACETAT  
EMULSION :DAMNEG  
change next







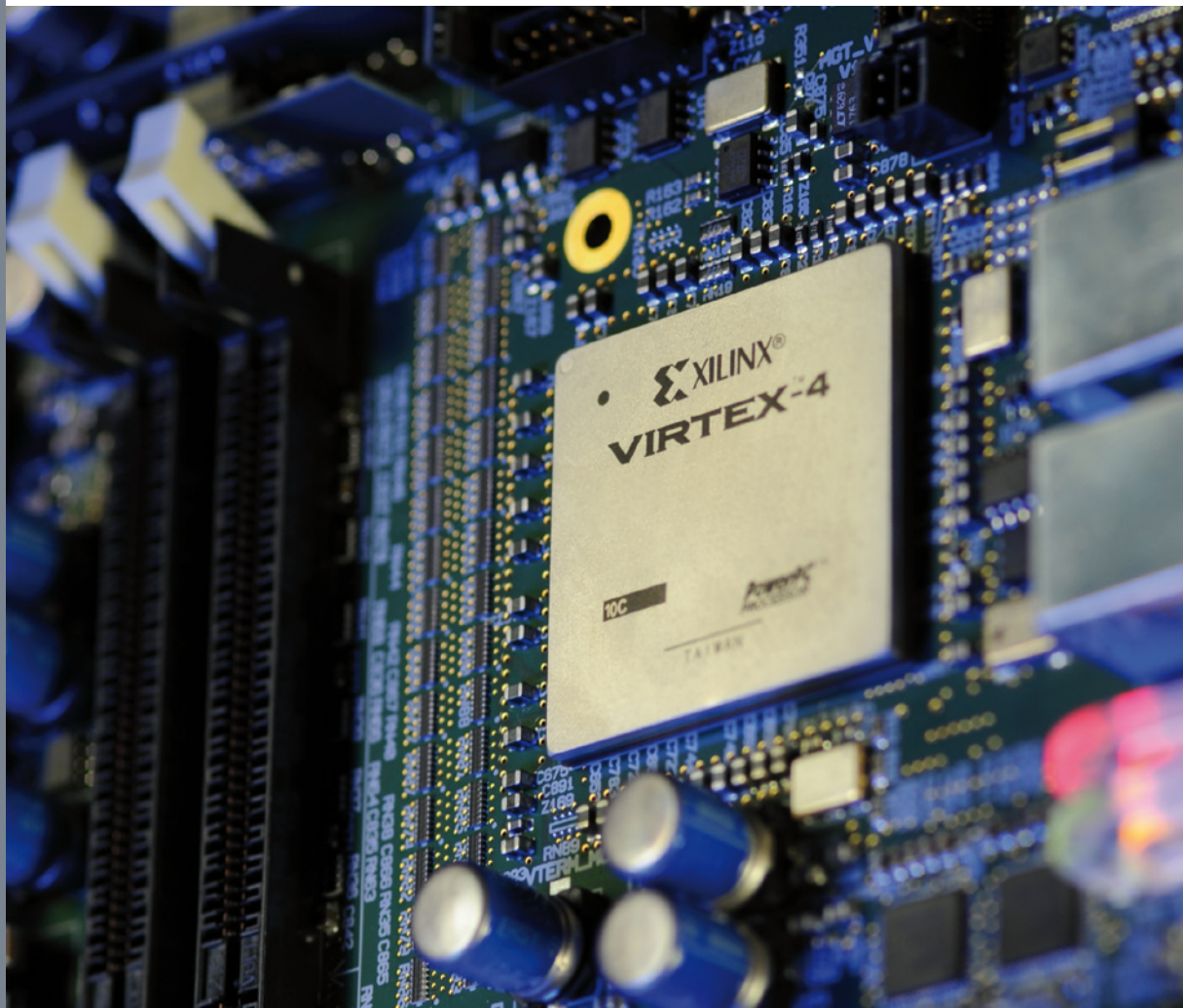
# HIGH PERFORMANCE

## Internal Electronics and Processing

Newly designed electronics now allow the bit depth of the internal processing to be raised from 10-bit to 16-bit, thereby rendering additional bit depth conversion unnecessary. This enables the processing of all 16-bit image data without any compression, from the file loader all the way down the data path to the D/A converter (digital-to-analog converter).

The implementation of commonly-used FPGAs (field-programmable gate arrays) on the electronics board results in improved data handling and eliminates image transfer errors. In combination with the CAN bus protocol, this speeds up both internal communication and processing, while also making the system safer.

# TOP LEVEL DESIGN



## ARRILASER Software

The new ARRILASER Trillian interface offers unprecedented flexibility of operation and is itself capable of speeding up daily operations.

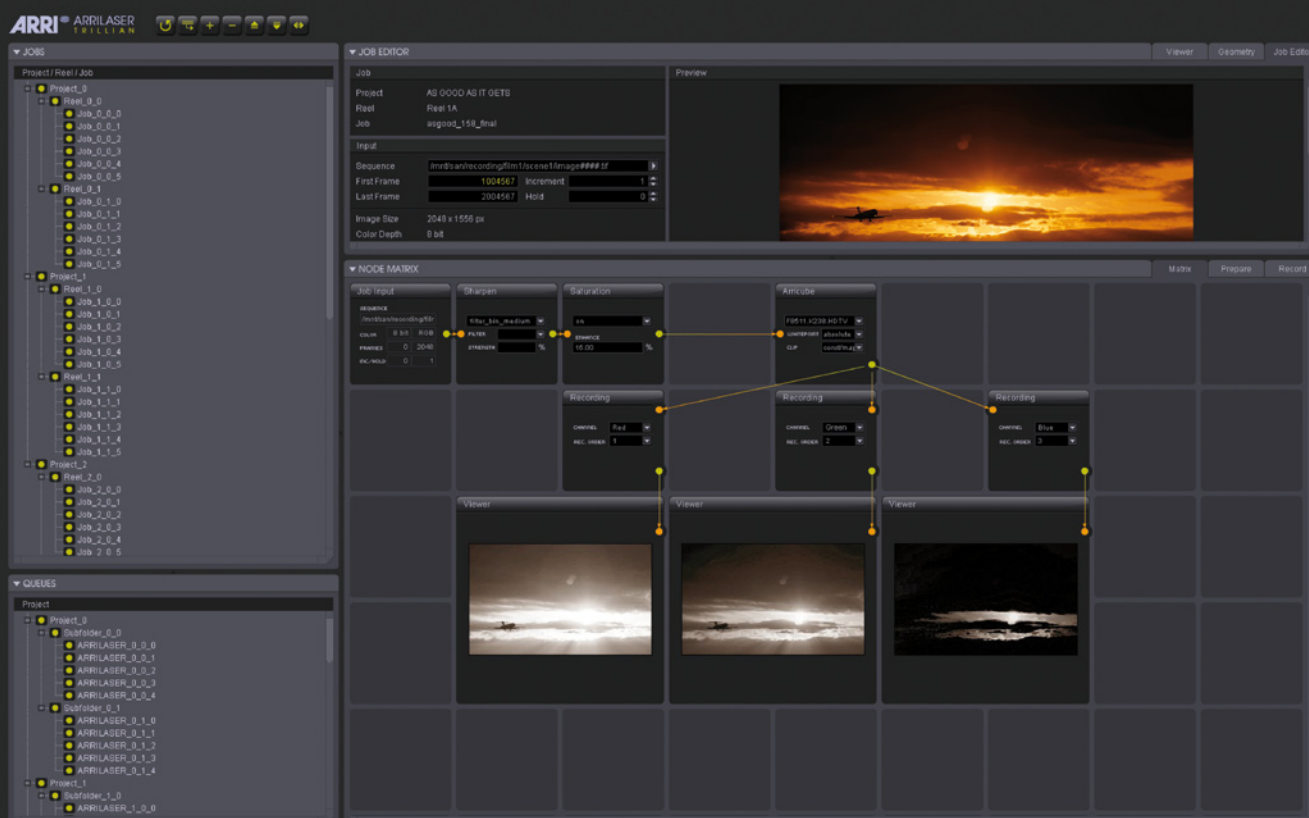
Trillian's main advantage is its ability to control and operate multiple lasers with the ease of just one application.

## Job Editor

A single, centralized job database allows multiple reel recording with just one click and greatly simplifies both job and calibration management. The new job editor allows easier access to recording jobs and also permits greater control of all image processing options.



Image Courtesy of EFilm Hollywood





## ImageBooster

The existing ARRILASER Image Processing Engine is being replaced by the new ARRILASER ImageBooster software that is also used in the ARRISCAN film scanner and ARRIFLEX D-21 camera. The ImageBooster utilizes not only the Host PC's CPU (Computer Processing Unit), but also – in line with the latest developments – permits rendering to be carried out entirely with the GPU (Graphics Processing Unit).

## Real-Time Image Viewer

A new image viewer with A/B comparison fully visualizes the image manipulation to avoid any unpleasant surprises after a recording has finished. With the new GPU-based rendering, all image manipulations made by the ARRILASER ImageBooster can be played back in real-time.

## Status Monitor

New software modules such as the Status Monitor allow everyone involved to have a constant overview of the progress of each individual recorder. There is no need to install any software to access the Status Monitor as it is simply an HTML broadcast and therefore runs on any internet browser that has access to the company's network.



**ARRI LASER STATUSMONITOR**

**SELECT GROUP**

- 01 AL005 ETC 00:23:12
- 02 PROJECT As Good As It Gets
- 03 REEL Reel 002
- 04 JOB As Good 034
- 05 AL006 ETC 00:56:34

**CURRENT GROUP**

AL006 ETC 00:56:34

PROJECT As Good As It Gets

REEL Reel 003

JOB As Good 072

AL007 ETC 00:08:33

PROJECT As Good As It Gets

AL008 ETC 00:28:07

PROJECT As Good As It Gets

REEL Reel 005

JOB As Good 145

**STATUS AL006** ETC 00:56:34

QU 01 QU 02 QU 03 QU 06 QU 07 QU 08 QU 09

FLM EXPOSED 0 m 150 m 300 m 450 m 600 m

REQUIRED REFINING

**JOB QUEUE**

Status / Frames:	Current	Total
● as_good_01	403	2344
● as_good_02	23	600
● as_good_03	1640	1640
● as_good_04	2344	4507
✗ as_good_05	600	5332
✗ as_good_06	403	1542
● as_good_07	35587	35587
▶ as_good_08	0	305
● as_good_09	704	704
● as_good_10	1640	1640
● as_good_11	806	806

**CURRENT FRAME**

**LOGFILE**

Date	Time	Type	Path	Status	Debug
07.08.2007	14:22	Image	test.0002.cin	successfully exposed	
07.08.2007	14:22	Image	test.0003.cin	successfully exposed	
07.08.2007	14:23	Image	test.0004.cin	failed	show details ▶
07.08.2007	14:23	Image	test.0005.cin	successfully exposed	



## Additional Options

### ARRICUBE CREATOR Software – Color Management Solution

This stand-alone software enables the user to create customized 3D LUTs for video-to-film work, which can be used on the ARRILASER with the Trillian 3D LUT Node. The ARRICUBE Creator generates also any kind of preview, Out-of-Gamut and XYZ conversion 3D LUTs for the DI workflow based on a digital display measurement and on a film profiling.

### TRILLIAN 3D Lut Node – ARRILASER 3D Lut Loader

This enables the ARRILASER Trillian to load a 3D LUT and to utilize the ARRICUBE Creators video-to-film 3D LUTs during the recording process. ARRICUBE Creator video-to-film 3D LUTs offer the possibility to match all colors of the film projection perfectly with the colors of a video monitor.

### Camera Negative Module – Recording onto Camera Negative Material

The camera negative option enables the ARRILASER to shoot onto camera negative film stock. Please see the ARRILASER technical specification sheet for details of supported film stocks.

### HD Module – Recording of 1920 Pixel per Line

This software plug-in allows recording of native 1920 pixel per line (HD Format) across the full aperture or academy area of the film without any rescaling.

### Native Academy Module – Recording Of Full Aperture Images

This software plug-in allows recording of native full aperture images (2048 or 4096 pixel per line) across the academy area of the film without any rescaling

### 3-Perforation Module – Recording of 3-perf Material

This allows the ARRILASER to generate a 3-perf negative with image frames that are three perforations high.

## Technical Data

Dynamic range	2.046 status M density above D <sub>min</sub> on intermediate film stock		
MTF	40% @ 40 lp/mm horizontal and vertical		
Film transport	2000' magazines, supply and take-up separate		
Shuttle mode	10 frames per second		
Supported filmstocks	Kodak Vision Color Intermediate Film 5242/2242; Fuji ETERNA-RDI 8511/4511; EASTMAN Fine Grain Duplicating Panchromatic Negative Film 5234/5366; Separation Material 2238  Optional with Camera Negative Module: Kodak Vision 2 100; Kodak Vision 2 50D 5201; Fuji 64D 8522; Fuji ETERNA Vivid 160 8543		
Host computer	Linux Redhat distribution with graphical user interface and machine and job database		
Network interface	Gigabit Ethernet and Fibre Channel HBA Dual 4GB, others upon request		
Physical dimensions	ARRILASER 2	size weight	115 x 115 x 65 cm approx. 285 kg
	ARRIAIR (Air compressor)	size weight noise	62 x 42 x 67 cm 64 kg ≤ 45 db(A)
Electrical requirements	operating voltage power consumption frequency	100–120V 6A / 200–240V 3A < 700 KW incl. host computer 50Hz/60Hz	
Operating environment	room temperature rel. humidity	19–24° Celsius 20–75% non condensing	
Warranty	12 months all inclusive		
Laser ratings	Laser product Class 1 according to IEC60825-1 and EN 60825-1:2007 Class 1 Laser product conforms to 21 CFR 1040.10 6 1040.11		
Safety Certificates	This product has been tested and found to comply with the limits for a class A ITE device according to: <b>EN-60950-1:2006</b>  Complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007		

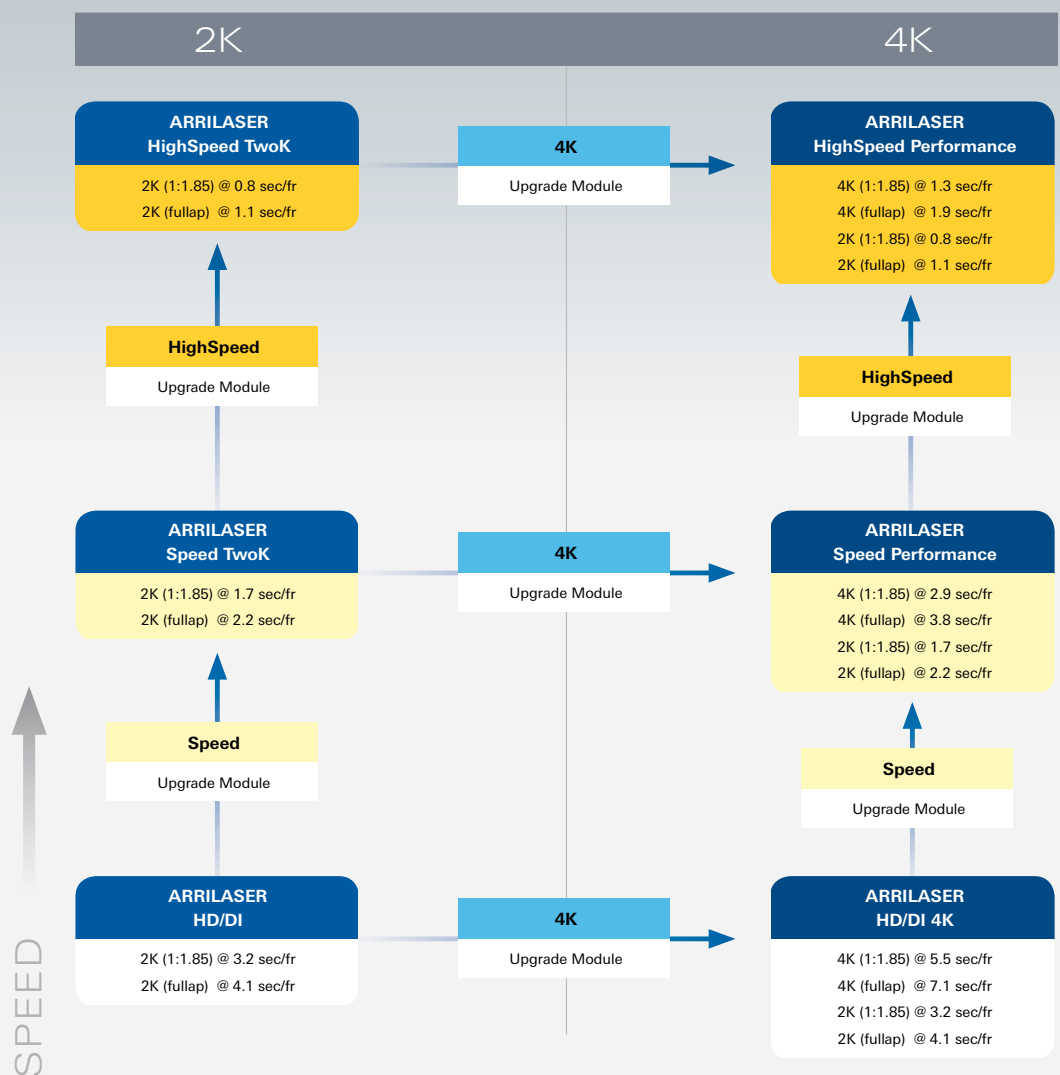
Technical data are subject to change without notice.



## Upgrade any Model

The ARRILASER is designed as a fully modular system and each model in the range is fully upgradeable. This protects the investment made by ARRILASER customers by ensuring that they can change and update their film recorders as and when the focus of their business shifts.

All models come with the same renowned image quality, performance and reliability. They are separated only by recording speeds and maximum image resolution. All models are also fully compatible with any of the additional options.





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